STATE OF VERMONT
PUBLIC SERVICE BOARD

Petition of Entergy Nuclear Vermont Yankee and Entergy Nuclear Operations, Inc., pursuant to 30 V.S.A. §248, for a Certificate of Public Good to modify certain generation facilities	))))	Docket No. 6812

Prefiled Testimony in Support of Memorandum of Understanding

William Sherman

on behalf of the

Vermont Department of Public Service

November 5, 2003

Summary: Mr. Sherman refers to his previous testimony and identifies the reasons for supporting the Memorandum of Understanding filed with the Board on November 5, 2003. He responds to certain questions from the Board.

Prefiled Testimony in Support of Memorandum of Understanding
of
William Sherman

Q. Please state your name and occupation.

A. My name is William Sherman, and I am an engineer with the Department of Public Service ("The Department"). My responsibilities include oversight for the state of the activities of the Vermont Yankee Nuclear Power Station and the nuclear power industry in general.

Q. Are you the same William Sherman who testified in this docket on behalf of the Department in hearings on June 17 and 19, 2003, and October 17, 2003?

A. Yes, I am.

INTRODUCTION AND SUMMARY OF TESTIMONY

Q. What is the purpose of your testimony?

A. This testimony supports the Memorandum of Understanding among Entergy Nuclear Vermont Yankee, LLC ("ENVY"), Entergy Nuclear Operations, Inc. (ENO), and the Vermont Department of Public Service ("DPS" or "the Department") ("the MOU") filed with the Board on November 5, 2003 (Exhibit DPS-WKS-12). This testimony identifies the additional benefits from Entergy described in the September 26, 2003 prefiled testimony of Ms. Wells and in the MOU, and compares these

benefits with the costs and benefits that I have identified previously in this docket. This testimony also responds to certain questions from the Board at the October 17, 2003 hearing.

Q. What are your conclusions regarding the proposed power uprate?

A. With the addition by Entergy of approximately $10 million (in nominal dollars) of benefit to the state and additional monetary protection in the event of uprate-related outages, the Department is able to conclude that the proposed power uprate meets the criteria for a certificate of public good in accordance with 30 V.S.A. §248. For the reasons stated below, the Department supports the proposal and recommends its approval by the Board.

Q. Does the MOU and the Department's recommendation for approval in this docket place any restrictions on the Department's review of the nuclear safety considerations in Entergy's license amendment proceeding before the Nuclear Regulatory Commission (NRC)?

A. No, the MOU places no restrictions on the Department's nuclear safety review. The Department will continue to act in the NRC proceeding to ensure its questions and concerns regarding nuclear safety are resolved.

COSTS AND BENEFITS FROM THE PROPOSED POWER UPRATE

Q. Please describe your review of Entergy's agreement to sell power to Vermont Electric Cooperative (VEC), described in Ms. Wells' prefiled testimony of September 26, 2003.

A. Ms. Wells describes an agreement to sell up to 10 MW of unit-contingent power to VEC over the period from January 1, 2004 to December 31, 2006 at a price held confidential but identified as below the Power Purchase Agreement ("PPA") price with Vermont Yankee Power Corporation and below forecast prices in the Department's 2003 estimate. I have analyzed the net present value of the benefit of this transaction and agree with Ms. Wells' statement (pft 9-26-03, at 3) that the range of benefit is $1 million to $1.6 million. For purposes of comparison, I use the low value in Ms. Wells' range as a NPV value and the higher value as a nominal dollar value.

Q. Since the VEC agreement is already made with energy from the Pilgrim Nuclear Power Plant, why do you consider this a benefit for the power uprate proposal for Vermont Yankee?

A. The intention in the agreement is to switch to uprate power from Vermont Yankee if it is available. I do not believe this agreement would have been struck without the expectation of the availability of uprate power from Vermont Yankee. Therefore, I credit this agreement as a benefit associated with the power uprate proposal.

Q. Please describe the adjustment to the potential tax benefit identified in your testimony of September 26, 2003.

A. In my September 26, 2003 testimony, I calculated the potential tax benefit from power uprate using a 10-year average capacity factors. I have recalculated the potential tax benefit using the same capacity factors assumed by Entergy, 92% for outage years and 97% for non-outage years. I believe

these capacity factors are reasonable estimates for the future. The 97% for non-outage years is slightly lower than the 10-year average of 98%. The 92% for outage years is better than the 85% ten-year average, and reflects the improved outage performance that Vermont Yankee (and generally all nuclear plants) have been able to achieve over the 10 year period. Using the new capacity factors, I calculate a potential tax benefit with net present value of $2,636,000 and a nominal dollar value of $4,070,000.

Q. Please describe the benefits from the Entergy funds established by the MOU.

A. DPS witness Frankel describes the funds established for the benefit of the state in the MOU. DPS witness Lamont calculates the benefit of the funds to be a net present value of $6,535,000 and a nominal dollar value of $10,185,000.

Q. Have you determined that a net benefit exists for the proposed uprate?

A. Yes, on Exhibit DPS-WKS-13, I have summed the costs and benefits. The proposal has a net benefit of approximately $9.8 million (net present value) or $15.2 million (nominal dollars). These amounts represent a clear benefit for the proposal and satisfy the benefit criteria (30 V.S.A. §248 (b)(4)).

OUTAGE PROTECTION AND OTHER ISSUES

Q. Please describe the outage protection provisions in Ms. Wells' September 26, 2003 testimony and in the MOU.

A. There are two parts to the outage protection provisions, which provide for reimbursement of losses to Vermont Utilities for their Vermont Yankee allotment for outages and power reductions caused by the power uprate proposal. The specific reimbursement is for the difference between 1) the price Vermont Utilities would have to pay to purchase its expected allotment during the outage or power reduction, and 2) the price Vermont Utilities would have received this power under the PPA had Vermont Yankee Nuclear Power Station not experienced the outage or power reduction.

The first part provides payments of up to $250,000 for six, approximate six-month intervals beginning after the scheduled return-to-service date for the Spring 2004 refueling outage. Protection payments are netted against savings Vermont Utilities may have experienced if uprate-related outages or power reductions occurred when market prices were lower than power purchase agreement prices. Unused portions of the protection payment are carried forward to succeeding protection payment periods, as are unpaid balance amounts. Therefore, the six payment periods result in outage protection up to $1.5 million.

The second part of the outage protection provisions provides for extra protection in high energy market conditions. For uprate-related losses in periods when prices are greater than $55.47 in 2004, $50.11 in 2005, $52.73 in 2006, and $55.34 in 2007, Entergy will pay Vermont Utilities for loss amounts for allotment energy above these prices up to $500,000 per payment period. The second part employs the same six payment periods as the first part. Also, like the first part, unused portions of the protection amount and unpaid balances are carried forward to succeeding protection payment periods. This second part results in outage protection up to $3 million.

Q. Do these levels of protection cover the amounts you stated in your September 26, 2003 testimony?

A. No. In my September 26, 2003 testimony, using an average price of $70 per MWh I stated loss amounts of approximately $5 million, $7.5 million and $10 million, corresponding to outage and power reduction equivalent durations of 30-, 45- and 60-days, respectively.

Q. Since the outage protection provisions do not cover the amounts stated above, please state the reasons you believe the outage protection provisions give Vermonters an adequate level of protection.

A. First, our price forecasts for 2004, 2005, 2006 and 2007 are $45.47, $40.11, $42.73 and $45.34 per MWh, respectively. Using these forecasts as average prices for the cost of energy during uprate-related outages, the first part of the outage protection provisions would cover any of 83 outage days in 2004, 365 outage days in 2005, 60 outage days in 2006, 42 outage days in 2007, or combinations thereof. The second part of the outage protection provisions provides protection above these amounts for either additional days of outage, or for outage situations which result in costs above average.

Second, I have calculated probability-weighted costs for a 30-day contiguous uprate-related outage in all of the test years, 2004, 2005, 2006 and 2007. For this calculation, I used a distribution of actual, daily-average market prices from November 1, 2002 to October 31, 2003. For each test year, I adjusted the distribution by the ratio of the DPS 2003 forecast for that year divided by the average annual market price for the distribution period. I calculated the probabilities for the 30-day outage to occur in various prices ranges and determined a weighted cost for each range. The results

of this calculation are provided as Exhibit DPS-WKS-14. These results show that 30-day outages could occur *in each of these years* and the outage protection provisions would be sufficient to cover Vermont uprate-related losses.

Third, Extended Power Uprate (EPU) plants have accumulated over 25 reactor-years of operating experience at uprated power levels. While Quad Cities 2 has experienced extended outages, the other plants have had good operating records. This suggests that extended uprate-related outages are less likely rather than more likely.

Finally, the benefit provided by the Entergy funds described by Ms. Frankel and Mr. Lamont is a large enough amount to offset uncertainties regarding uprate-related outages.

While it is possible to imagine outage situations that would result in losses above the protection amounts, these situations are not likely based on our forecasts. Therefore, the outage protection provisions are a reasonable amount of protection against Vermont Utility losses from uprate-related outages.

Q. Please describe your review of Entergy's proposal to install new, 125 hp, high efficiency fan motors in the Vermont Yankee cooling towers.

A. During testimony on October 17, 2003, I was asked about the Department's position regarding the Entergy's plan to install 125 hp, high efficiency fans rather than 200 hp, high efficiency fans in its cooling towers. As a result, I have reviewed the issues and testimony regarding the cooling

tower fans, and conclude as I stated on October 17, 2003, that I would not recommend 200 hp fans over 125 hp fans (tr 10/17/03 at 179-180).

Q. Please describe the issues regarding the cooling tower fan motors.

A. The issues are as follows:

- Noise Analysis - 200 hp fans operate at a higher noise level
- Evaporative Loss - 125 hp fans have greater evaporative loss
- Silt Deposition - 200 hp fans have more silt deposition
- Visible Plume - 125 hp fans have a greater visible plume effect
- Energy loss from derating - 125 hp fans have more derating
- Energy loss from running fans - 200 hp fans use more energy
- Cost to Entergy - Installation of 200 hp fans is significantly more expensive by a number of millions of dollars than 125 hp fans

Mr. Yasi has presented testimony describing the noise, evaporative loss, silt deposition, visible plume and energy effects. Ms. Schuyler has evaluated the impacts of the noise, evaporative loss and silt effects, and Mr. Dodson has evaluated the impacts of the visible plume. I have calculated the economic impact to Vermonters from cooling tower derating.

Entergy's testimony in this area has the following peculiarity. Testimony is provided for both 125 hp *existing* case and 200 hp fan motors. The effects for the proposed 125 hp high-efficiency motors are not specifically provided, but are bounded by the cases presented.

Ms. Schuyler describes that the noise impact for 200 hp fans should not be noticeable (pft 2/21/03 at 9). Regarding evaporative loss, Mr. Yasi introduced a revised evaporative loss study (Exhibit EN-DEY-3R) during testimony on June 17, 2003. The study identified evaporative losses for

both 125 hp and 200 hp cooling tower fans, and showed that both results were bounded by the "conservative" case evaluated by Ms. Schuyler. Ms. Schuyler concludes that evaporative loss due to power uprate from the bounding case would not be significant (pft 2/21/03 at 19-20). Ms. Schuyler also evaluates that sufficient capacity exists to accommodate cooling tower silt (pft 2/21/03 at 16). Regarding the visible plume effects, Mr. Dodson has evaluated the impact for 125 hp fans (Exhibit EN-HLD-3) and concludes that the effects are adverse but not unduly adverse. I have reviewed Ms. Schuyler and Mr. Dodson's results in these areas and agree with their evaluations.

Q. What is your conclusion regarding cooling tower fans?

A. If Vermont Yankee were a cost-of-service regulated entity, I would determine that the cost of implementing 125 hp fan motors is significantly less expensive than 200 hp fan motors, and the 125 hp option should be chosen on that basis. For the current merchant plant evaluation, I conclude that the proposed uprate does not have an unduly adverse effect regardless of which fan is chosen. I calculated the NPV cost to Vermonters from derated conditions as a result of power uprate to be the relatively low amount of $408,577 over the remaining nine years of operation. This calculation is based on 125 hp *existing* fans - the proposed 125 hp high-efficiency fans will result in a lower derate cost than shown above. Since this cost is small compared to the overall benefit Entergy is providing through the MOU, the selection of 125 hp fans is acceptable.

Q. Please describe the result of the Department's review of the Final Report to ISO-New England for Vermont Yankee Uprate System Impact Study ("the ISO-NE Study"), dated October 7, 2003.

A. ISO-NE has determined that Entergy's proposed power uprate will not have significant adverse effect on the reliability or stability of the ISO-NE system, subject to performing seven specific projects and an eighth contingency based on queued projects. Entergy has committed to accomplish these projects.

Our review of these projects with Entergy determined that Entergy has a high likelihood of accomplishing six of the seven projects within the time constraints for power uprate. For the seventh project, installing capacitor banks in the Vermont Yankee switchyard, Entergy will ask ISO-New England for approval to accomplish that project in the Fall 2005 refueling outage, based on the partial power uprate between Fall 2004 and Fall 2005, and the reactive power available in its modified generator. Accomplishing these projects is dependent on assumptions for agreements with outside parties and regulatory approvals. We have also determined that outage time associated with implementing these projects is insignificant.

If implementation of these projects is delayed causing a delay in producing uprate power, the estimated benefits from the proposed uprate would be reduced. However, the ISO-NE Study and Entergy's commitment to accomplish the projects identified, demonstrate that the proposed uprate meets 30 V.S.A. §248 (b)(3) regarding system reliability and stability.

Q. How do you believe the Board should consider the NRC review of the nuclear safety aspects of the power uprate proposal?

A. I am monitoring the progress of NRC's review of nuclear safety aspects in addition to performing a review of these issues. I am aware that NRC has begun a significant review, has been in contact with various Entergy Nuclear Vermont Yankee personnel regarding questions, and will ask numbers of formal Requests for Additional Information. Based on my interaction, I can see that NRC does not take Entergy's application for granted, but is embarked on a thorough and questioning review. Regarding the Department's entering into the MOU and recommendation for approval in this docket, nothing in these actions restricts the Department's review of nuclear safety and positions it may take before the NRC.

As I have stated in testimony previously, the Department believes the Board can rely on the NRC's review of nuclear safety, and should grant the requested certificate of public good. The Department will continue to monitor the NRC process, and if actions occur which materially modify the issues in this proceeding, the Department would inform the Board.

Q. Please summarize the Department's position with regard to the criteria for a certificate of public good in 30 V.S.A. §248 (b).

A. I have described above that the proposed uprate meets the system stability and reliability criteria ((b)(3)) and the benefits criteria ((b)(4)). In my prefiled testimony of May 9, 2003, I describe how the uprate meets the need criteria ((b)(2)). Regarding the other criteria, I have reviewed the

arguments of Entergy witnesses Thayer, Lesser, Schuyler and Dodson, and agree with their conclusions that the other criteria are met.

CONCLUSION

Q. What do you conclude regarding the proposed transaction?

A. As described above, the proposed power uprate conforms with the criteria of 30 V.S.A. §248. Therefore, the Department recommends the Board grant a certificate of public good to Entergy for proposed power uprate.

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Q. Does this conclude your testimony?

A. Yes, it does.